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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,292

09/18/2006

Shinichi Yoshikawa

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WENDEROTH, LIND & PONACK, L.L.P.

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EXAMINER

BAUMSTEIN, KYLE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,292	Applicant(s) YOSHIKAWA ET AL.	
	Examiner KYLE BAUMSTEIN	Art Unit 4171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/18/2006, 10/29/2007</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

The title of the invention appears to contain a typographical error. A new title is required.

The following title is suggested: "Resin composition, paint, resin solution, urethane-based resin paint, adhesive, and printing ink."

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: an isocyanate reactive group in the base polyolefin. Without the inclusion of an isocyanate reactive group (i.e.: hydroxyl, amine, etc.) on the polymer, the chlorinated polyolefin will not react with the added isocyanate compounds. Assuming the claimed invented composition is a crosslinked polyurethane resin, it would be necessary to have a functional group reactive towards the crosslinking group present in the backbone.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suganuma et al. (US PGPub 2003/0069353) as well as Fry et al. (US Pat. 4954573) and Sanders et al. (US Pat. 4870206).

Regarding claims 1-6, the instant application claims a resin composition comprising 100 parts by weight of chlorinated polyolefin with a chlorine content of 10-50% by weight, 0.01-10 parts by weight of tris(isocyanatophenyl)thiophosphate, and 2-40 parts by weight of an organic diisocyanate compound. The chlorine content is further limited to 20-30% by weight. The amount of tris(isocyanatophenyl)thiophosphate is further limited to be 0.5-5 parts by weight per 100 parts by weight of the chlorinated polyolefin and the amount organic diisocyanate added is further limited to 3-30 parts by weight per 100 parts by weight of the chlorinated polyolefin. The organic diisocyanate is claimed to be 4,4'-diphenylmethane diisocyanate.

Suganuma teaches a water-dispersible polyisocyanate composition comprising a hydrophobic polyisocyanate (A) and a vinyl polymer having a nonionic group and an isocyanate group (B). The vinyl polymer is disclosed to be chosen from a group including a fluoroolefin polymer (§ 0020). The examiner maintains that without unexpected results, due to the limited number of halogens and the similarities between them, the use of a fluorinated polyolefin reads on the applicants' claimed chlorinated polyolefin. As the hydrophobic polyisocyanate, the prior art teaches the use of a variety of isocyanates including both

diphenylmethane-4,4'-diisocyanate and tris(isocyanatophenyl)thiophosphate (§ 0017). Furthermore, it is disclosed that the method for synthesizing the vinyl polymer having a nonionic group and an isocyanate group is characterized by reacting a hydrophobic polyisocyanate with a vinyl polymer having a non-ionic group and an active hydrogen group capable of reacting with an isocyanate group (§0044). In said method, Suganuma discloses that the same polyisocyanate exemplified for the hydrophobic polyisocyanate (A) can be used as the hydrophobic polyisocyanate (§ 0045). The examiner interprets this to mean that the polyisocyanates listed as acceptable hydrophobic polyisocyanates to be used for component (A) can also be used here, all inclusively. Therefore, a polymer arrived at by reacting a halogenated polyolefin with diphenylmethane-4,4'-diisocyanate that is further reacted with tris(isocyanatophenyl)thiophosphate reads on the composition as claimed in the instant application.

Suganuma teaches the use of a halogenated polyolefin polymer, yet is silent with respect to the amount of said halogen included. Fry teaches chemically-modified, chlorinated, polyolefins having improved properties of solvent and/or humidity resistance. It is stated that the chlorinated polyolefin should have a chlorine content of from about 10 to about 40 weight percent. The reference discloses that the most preferred chlorine content of about 20-24 weight percent provides a chlorinated polymer having not only good solubility, but also forms primer coatings which do not redissolve when a top coat is applied to the surface. Therefore, to obtain a polymer having good solubility as well as

resistance, it would have been obvious to one having ordinary skill in the art to have used a polyolefin containing between 20% and 24% of a halogen.

The prior art is also silent with respect to the motivation to use tris(isocyanatophenyl)thiophosphate. However, Sanders et al. teaches the synthesis of aromatic polyisocyanate and their use as components for adhesives. The invented complexes are disclosed to be added to a variety of polymer resins including synthetic rubbers, more specifically polymers or copolymers of 2-chloro-butadiene with a chlorine content of about 36% by weight (col. 6, line 22). While the invention is drawn towards polyisocyanates having better properties, it is disclosed in the background of the invention that thiophosphoric acid tris-(p-isocyanatophenylester) is a well-known, typical example of a suitable starting material for the preparation of adhesives and it is particularly distinguished by its good adhesive properties (col. 1, line 15-34). Therefore, it would have been obvious to one having ordinary skill in the art to have used this component as the hydrophilic isocyanate as disclosed in the composition taught by Suganuma.

Also, Suganuma teaches the use of the aforementioned isocyanates in the composition, yet does not mention the amount of said isocyanates to add, relative to the weight of the unmodified polyolefin backbone polymer. Isocyanates are known in the art to be effective crosslinking agents for a variety of polymers. The amount of crosslinking that occurs is a direct result of the amount of isocyanate added to the composition. The properties and characteristics, both chemical and physical, of the resulting resin composition will be directly related to the amount of crosslinking. The addition of a large amount

of crosslinker will result in a polymer that is strong, yet brittle. The addition of a small amount of crosslinker results in a flexible, weaker polymer. The use of polyfunctional isocyanates has the same effect being that the addition of more isocyanate functionalities creates more crosslinking between the polymer chains. Therefore, it would have been obvious to one having ordinary skill in the art to have optimized the amount of di- and tri-functionalized isocyanates so as to create a polymer resin having a desired strength and flexibility.

In claims 7-11, the instant application claims a variety of uses for the claimed composition. Applicants claim a paint, adhesive, and printing ink containing the aforementioned resin composition. Also claimed is a resin solution which is obtained by dissolving the resin in a solvent so that the resin composition content thereof is in the range of 10-40% by weight and a urethane-based resin paint comprising the aforementioned resin composition and a polyol.

Suganuma teaches the previously discussed polyisocyanate composition comprising a polyisocyanate, an isocyanate group-containing vinyl polymer, and a second, water-based resin. The second resin, with which the polyisocyanate composition is mixed with is disclosed as having at least one active hydrogen group capable of reacting with the isocyanate group. Given as a typical example of such a functional group is a hydroxyl group (§ 0096) and a suitable water-based resin is stated to be selected from a group including phenolic resins. Such a composition reads on that of claim 12 wherein the polyol is the phenolic resin. The prior art also suggests that the invented water-based composition as is disclosed can be obtained by mixing the water-dispersible polyisocyanate

composition, as discussed above, with water. It is disclosed that 10-1000 parts by weight of water may be added to 100 parts by weight of the polyisocyanate composition. Furthermore, the amount of solvent to which a composition is added will directly affect the viscosity of the resulting solution. The viscosity will subsequently affect the composition's usefulness as a coating. Therefore, it would have been obvious to one having ordinary skill in the art to have optimized the amount of solvent so as to result in a solution having the desired viscosity for a given application.

The composition as taught by Suganuma is disclosed to have a variety of possible applications. Such applications are listed in a group including coatings, adhesive, and inks. The examiner regards the use of said composition as a coating as reading on the instant application's use of the claimed composition as a paint.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KYLE BAUMSTEIN whose telephone number is (571)270-5467. The examiner can normally be reached on First Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald L. Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 4171

/KBB/